DIGITALIZATION AND DIGITAL TRANSFORMATION IN TAKING THE OMAN ACADEMIC ACCREDITATION ROUTE – A CRITICAL ANALYSIS FOR OMAN BASED EDUCATIONAL INSTITUTIONS

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ABSTRACT

Higher Education Institutions across the world will have to take a digital route in imparting knowledge and skills to the students' community. The world got stunned when it was hit by COVID- 19. Business Sectors were exploring alternative methodologies for continuing their business activities. Business Units had started investing huge amount of money on digitalizing and digital transformation of their processes, so that could keep moving ahead in the market achieving their goals and objectives. Likewise, educational institutions were also thinking extensively about the learning support to be extended for the students' community to learn and to progress. Educational institutions also had to take up the same route of using internet technologies extensively to reach out students' community. So, digitalization and digital transformation have become the essence now. Educational institutions have taken Internet Technologies as one of the key routes for imparting education and providing allied services to students. This trend would continue to be dominating and replacing the conventional teaching practices soon. Education Institutions need to re-orient their operations like teaching and learning, staff and student services, marketing, governance, industry-community engagement, digitally. For educational institutions, data concerning students, pass outs, graduating, placements etc are of vital importance for evaluating their strategic plans and preparing action plans accordingly. The government of Sultanate of Oman has allocated approximately 1.58 billion Omani Riyals in 2018 for providing quality education that is on par with international standards. (Press Reader, 2019), which shows its commitment towards enhancing the quality of higher education.

The Higher Educational Institutions in Sultanate of Oman have been implementing internet-based technologies in teaching and learning during COVID – 19 period. They

have been in favour of digitalizing teaching and learning and academic support services. Educational Institutions in Oman must be accredited by Oman Accreditation Authority, an apex accreditation authority. The apex authority is prescribing certain standards to be complied with by the educational institutions to have been certified as an accredited and excellent academic service providers in the country. So, there exists a good scope for the use of digital technologies in educational institutions in rendering various educational services like serving alumni, gathering data about students' issues, identifying industry requirements in making plans about new offerings etc. Use of digital technologies would help higher educational institutions achieving its objectives and goals without many hardships.

Keywords: Digitization, Digital Transformation, Oman Academic Accreditation Authority (OAAA), Educational Standards.

1. INTRODUCTION

Digitalization and Digital technologies are the future of business processes. Educational institutions need to equip themselves to adopt digital technologies in rendering various academic related services. In one of the recent studies done by New Media Consortium (2017), the following digital technologies have been identified as the key technological developments that could be highly used in higher education sector, such as learning analytics, adaptive learning technologies, IOT, Mobile Learning, Natural User Interface, Next Generation LMS, Affective Computing, Augmented Reality, Virtual Reality and Robotics. As world is moving towards digitalization and digitization, education sector cannot be exempted from it. Higher Education Institutions like Colleges and Universities must think seriously about adopting digital technologies permanently in imparting knowledge and skills to students' community. This cannot be regarded as an advancement in the processes rather it can be regarded as a major shift in knowledge creation and delivery. Secondly, all educational institutions are subject to accreditation by an authority that stipulate standards. So, educational institutions must be seriously thinking about employing digital technologies that could help them rendering services better and on par with the standards prescribed by that accreditation authority. For instance, the technologies such as Blockchain technology, which would prevent tampering educational certificates issued by HEIs and cloud computing could be major cloud storage facility available for processing and storing voluminous data and artificial intelligence technologies is one of the greatest means for performing various teaching, learning, and performing other academic services. Thus, the challenges ahead of educational institutions coming under higher education sector are twofold i.e., digitalization of educational services that is meeting the expectations of students' community at large and adopting technologies that help them to meet the standards specified by the nation's accreditation authority.

2. CONCEPTUAL DEFINITIONS

As the paper discusses about three elements of digitalization of education services, conceptual definitions of those elements would be relevant.

2.1. Digitization

I-scoop (2020) defines that digitization is converting the data being present in non-digital formats to digital formats, so that can be used well by computer systems for other purposes. It means simply changing the format of data being stored within an organization. Organizations used to keep data in paper format, images etc. which are subject to vulnerability of getting lost or damaged. Secondly, data available in non-digital format needs good processing to make them ready for analysis and preparing reports, which in turn takes longer duration, which poses a challenge for an organization in its timing reactions to a scenario. If data being kept in digital formats, then the issues arising out of having kept data in analog formats could be well-addressed and also getting insights is possible by deploying data analytics tools.

2.2. Digitalization

Medium (2020) presents that digitalization is using the digital technologies and digitized data in delivering the essential services and deriving maximum benefits out of using such technologies in the various business processes being practiced within an organization. For example, information is one of the vital resources that any organization depends on extensively and using that they make appropriate decisions. Thus, the need for digital technology arises invariably for the organizations. Organizations/educational institutions. need to have technologies that would assist them in processing data and producing information, which could be very well used in decision making process. Secondly, operational efficiency is one of the core objectives that all organizations want to achieve. Organizations wish to perform their business operations using lesser resources so that they can be regarded as most economical, which becomes an indicator of operational efficiency. Organizations are assigned with a responsibility of value creation and to provide enhanced value to its customers. To achieve the maximum output from the given processes, the consumption of input should be helping as much as it could, which is highly possible through use of appropriate digital technologies. Thus, the process of using technologies in performing various processes within an organization to achieve greater efficiency in terms of cost and time consumption is termed as digitalization

2.3. Digital Transformation

Salesforce (2020) defines that Digital transformation is modifying the way a business is being done, that paves for organizations to come out with new way of performing businesses. Organizations could provide improved customer experience, enhanced decision-making processes, adding further value to its products and services, expanding business to other related and non-related areas, optimization of resources consumption etc. With the help of digitization and digitalization, organizations are getting transformed to offer the best to its customers and other stakeholders.

The following table summarizes the impact of these processes:

Table 1

Digitization	Digitalization	Digital Transformation
Changing the way, the data being stored	Use of digital technologies to get the maximum value out of various processes	Transforming the way, the businesses being carried to provide enhanced value to clients and customers
Data can be kept/stored for very long periods	Forward moving approach to ensure efficiency and effectiveness	Identifying extended scope for businesses to explore
Investing on resources to gain a competitive edge on data processing	Seeking assistance of technologies for value additions	Keep growing and expanding businesses through exploring business opportunities arising on the go.

3. RESEARCH OBJECTIVES

The following are the research objectives of this conceptual paper:

(i) To present theoretical background on the digitization, digitalization, and digital transformation and its relevance for an educational institution.

(ii) To Present how digital and digital transformation of educational institutions can help educational institutions in meeting quality assurance standards.

(iii) To present a conceptual model for digitalizing the academic and administrative services of an educational institution with special reference to an Oman based Higher Education Institutions.

(iv) To analyze the benefits and challenges of digitalizing processes.

4. DIGITAL READINESS FOR OMAN

Digitalization and digital transformation are something that Oman based organizations both business and service sector organization can easily achieve due to the fact that there has already been extensive internet usage within the country.

Table 2 Showing the % of Internet users in Oman

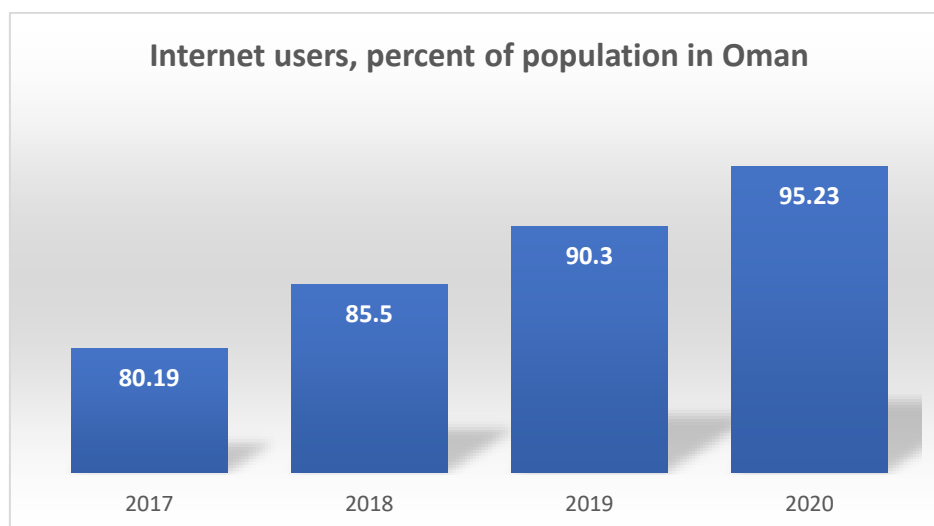| Country	Code	Year	Internet users, percent of population
Oman	OMN	2017	80.19
Oman	OMN	2018	85.5
Oman	OMN	2019	90.3
Oman	OMN	2020	95.23

(Source: the global economy, 2021)

Figure 1 Showing the percentage of population who are internet users in Oman.

The above table and chart illustrate that internet users in Oman are increasing annually by 6.62%, which reflects the willingness of people and corporate organizations to change themselves to digitalization proposed by the top management. In that context, digitalization would be given due importance by the education sector and by all the stakeholders of education sector.

5. LITERATURE REVIEW

LaPlante et. al (2016) present that higher education institutions provide services to wide variety of sectors in an economy. This diversity encourages institutions to go for intensive collaboration with many organizations. This would bring in the need for use of various digital technologies. To work in collaboration with many parts of the society like students, faculty, ministry, parents, alumni, graduates, industries etc, institutions will have to invest on innovative technologies. Such collaboration is the need of the hour for all educational institutions since that make them competitive and comparable with international institutions and standards.

Tumbas et. al (2018) argue that evidence-based, quantitative, and predictive decision-making should be a quite dependable way of getting competitive advantage. This is the approach that organizations currently follow. The same approach is highly recommended for educational institutions as well to gain competitive advantage over other institutions. This is highly possible for any institutions through using digital technologies intensively such as Artificial Intelligence, Robotics etc. Data analytics is the core process to be adhered to by educational institutions to provide value additions in their services and to gain competitive advantage.

GLC (2017) presents those new technologies are contributing for changes in pedagogical approaches followed across educational institutions, since these technologies allow instant access to information from any place. Thus, adopting such technologies widens the scope of teaching and learning and learning happens anytime, anyplace and happening continuously adding to the existing knowledge. This makes it a point that digital technologies are changing the traditional approaches being followed at educational institutions and creating new opportunities and means of providing it. Digital technologies would help educational institutions a lot in moving towards this direction for the educational institutions in Oman.

OECD (2016) argues that "education can also foster innovation in society at large by developing the right skills to nurture it". Students of current generation require skills such as critical thinking, creativity, and imagination. Such skills can very well be imparted to students through use of digital technologies. Digital technologies would help in designing appropriate teaching practices and providing support services to students' community and to the society. Fortinet (2016) argues that students are now carrying devices for their classes. So, educational institutions must provide safe learning environment that are well integrated and protected, so that any data shared is not lost. Thus, use of digital technologies such as Blockchain, Cybersecurity are essentials for any educational institution. This brings a wide gap for the educational institutions to bring in digital technologies to be used widely by them within the institution and with other collaborators outside the institutions.

Digital pedagogy that is to be adopted in educational institutions is basically lying on assessing educational models that use technology in the classroom. This poses many challenges for the institutions. (Boling & Smith, 2014; Chai, Koh, & Tsai, 2013, Gros, 2015; Harris, 2013). Educational Institutions are doing extensive research currently on how technology would bring drastic changes in the pedagogies. (Flewitt, Messer, & Kucirkova, 2015).

Islam et.al (2018) presents that currently learning styles are getting converted into digital technologies based. Digital education is also happening using various social networking websites as well. Educational institutions believe that learning will happen on various social networking sites such Facebook, Twitter, Instagram etc. in the future. This study addresses the students' perception on learning using social networking websites such as Facebook, Twitter etc and argues that it is going to be the future of education. Conventional education system is slowly getting reshaped using various digital technologies. The role of teachers and other academic support providers will be changed in the future due to digitization processes. Teachers will take the role of academic support providers rather than tutors themselves. Digitization

brings challenges as well, but such challenges could be very well handled if educational institutions would have invested appropriately on digital technologies. Thus, digital education is the future of education, and no educational institution could spare to give up digitization.

Sebastian et al. (2012) pointed out that digital learning has been rapidly developing in the recent years and would be dominating in future. Digital educational institutions are becoming highly popular these days since it broke the conventional learning methods. Digital learning is slowly replacing the current educational system through the advantages it yields for both the society as a whole and the students' community. Digitization of educational services would bring huge benefits for the educational institutions as the processes are becoming automated, operational efficiency is easily achieved.

Lin et. al (2017) presents that digital education makes educators and educational institutions to utilize the shared education resources on the computer network. This is being done to shorten the gap existing between education provided in urban and rural areas of a nation. Education being provided always gets the difference on the place where it is being provided. Students in Urban areas gain a competitive edge in receiving the best quality education compared to the ones being provided in rural areas. This results in producing economies with wage differentiation, knowledge base been created, innovative capabilities etc. Digitization brings integration and educators are required to use such technologies in the educational processes. This would bring down the differences being perceived so far and would contribute to a larger extent in getting the required knowledge base required for building up innovative capabilities in students' community.

Dmitrieva et.al (2018) present that today the world is moving towards bringing into practices that are highly innovative in nature, so that real change can be brought in the form of education been delivered. The challenges in this regard they would face in means of information sharing and storage. Digital transformation would help education institutions a lot in making drastic changes in their processes to achieve its objectives. Digitization not only makes education meaningful and at the same time, education institutions powerful and the biggest source of innovations.

Idrees (2016) argues that Digital learning can give a big platform for students who are not having any access to conventional educational tools due to various reasons. Digital learning improves other skills such as cognitive, humanistic in learning community. This is going to be providing a big motivation for students to learn. Digital education is not only helping educators, educational institutions, at the same time provides a good scope for the students to learn better. Digitalization can act as a big motivator for the students' which would attract many students to come for learning. This is the ultimate objective of any education system. Education should be provided to all and should not be denied due to some constraints they have. This could possibly be well achieved through digital transformation processes being adopted by educational institutions.

Bejinaru (2019) states that digitalization is one of the progressing trends in the education sector and in the business world overall. He recommends that digitization could be very well employed in academic and non-academic side and benefits of such digitization could be reaped of. Secondly, digitization brings lots of benefits and makes education open for everyone. It removes geographical barriers and gives and high degree of independence. Digitizing educational activities would make education more meaningful and productive, in the sense that, education becomes available for everyone despite of the geographical barriers and other issues.

Implementing Digital Technologies are expensive from investors' point of view. However, considering the enormous benefits of digital technologies would yield, investors would prefer to invest. Such an investment on digital technologies can make teaching and learning more

flexible and will provide a room for lifelong learning skills for the students (Blaschke et.al, 2015). Digitizing and digitalizing are expensive activities. No doubt about it, but at the same time, enormous benefits could be gained over these. Thus, educational institutions should be striving to achieve excellence through digital transformation. Initially, it would look like a heavy investment activity, but in due course, the benefits of digitalization would outweigh the costs and make educational institutions to reach out international students, thereby provides a room for acquiring international brand name and reputation.

6. OMAN ACADEMIC ACCREDITATION AUTHORITY (OAAA) FRAMEWORK FOR OMAN BASED EDUCATIONAL INSTITUTIONS – A BASIS FOR DIGITAL TRANSFORMATION

This research will focus on the possible digitization initiatives to be adopted based on the OAAA Framework. This paper will also investigate the opportunities and challenges of implementing digital technologies which will support adhering to OAAA standards more effectively. The introduction of Quality Audits in the context of Oman's higher education sector aimed to encourage a shift in the quality assurance culture to a position where an HEI is expected to take responsibility for the development of its internal quality management systems and to review their effectiveness. A deliberate decision was made to introduce a two-stage institutional accreditation approach in which the first stage – Quality Audit – would encourage HEIs to develop their internal quality management systems while giving the public reassurance that the HEIs were being monitored, prior to the second stage of assessment against external standards: Standards Assessment.

The first Institutional Quality Audits commenced in 2008. Quality Audits focus on the following nine areas which are mirrored in the Standards Assessment scope:

- Governance and Management
- Student Learning by Coursework Programs
- Student Learning by Research Programs
- Staff Research and Consultancy
- Industry and Community Engagement
- Academic Support Services
- Students and Student Support Services
- Staff and Staff Support Services
- General Support Services and Facilities.

6.1. Digital Transformation to Comply with Governance and Management Standards

Governance and Management is for top level management of an Educational Institution. These standards basically cover the long-term goals, mission, and strategic plans of an educational institution. This standard provides a route map for the institution to move ahead in their path of achieving its vision. Digital transformation would help educational institutions in the process of preparation of various plans. Data stored in digital formats would assist educational institutions in performing economy and industry analysis, evaluating strengths and weaknesses in terms of resources and in setting feasible targets. Strategic planning process involves in-depth analysis of environmental factors that include competitive forces, thus data availability in digital format is highly demanded.

The following table illustrates the digital transformation process that could possibly be adopted in meeting the governance and management standards:

Table 3 Reflecting the Digital Transformation that is relevant for Governance and Management Standards

Stages of Digital Transformation	Process Improvements
Standard (1)	Governance and Management – covering top level management functions including strategic planning, formulating goals, drafting operating plans, risk management etc.
Digitization	Data collection and storing data sets in digital formats
Digitalization	Use of Ipads, Bigdata and Analytics
Digital Transformation	Strategic planning of an institution requires voluminous data and information. Using digital technologies in data collection and storing data for its effective utilization is the need of the hour for an educational institution. This makes strategic planning process simpler and in formulating realistic goals and objectives.

Digitization brings out a big change in the way that governance and management is being perceived of. Use of digital technologies in governance processes removes the hazard of saving voluminous data in traditional ways using files, in papers and in computer files. Digital transformation would help in collecting, analyzing and present the required reports in a more structured manner. Good governance is highly achievable for the educational institutions through the digital technologies such as Big data, analytics and simulation models. (Grove et al., 2018)

6.1.1. Critical Discussion on Digitization of this Process

The critical discussion on digitizing this process can be summarized as:

Table 4

Benefits	Challenges
Top management would be able to get access to voluminous data. This can be of great help in setting strategic goals and objectives and actions for achieving them.	Management must be willing to make investments on having such sophisticated technologies like Big Data, Analytics and Simulation models.
Focus on achieving mission and vision is easier	Trained staff must be available for fully using such technologies possible.
Reporting becomes easier. Data analysis becomes easier for top management as it has access to voluminous data	Effective utilization of technologies is very much required to get maximum advantages. Training on use of such technologies is the need of the hour, which would be costing a lot.

6.2. Digital Transformation to meet Standards of Students learning by Course Work

Students learning is the core of an educational institution. Quality of students learning cannot be compromised due to the degree of digitization been adopted within an educational institution. At the same time, learning can happen at any time and to all, if digitalization is widely practiced by educational institutions. Many researchers conclude that digitization would take learning to people who have issues in getting it due to various reasons. Digitalization would aim at modifying the role of tutors from conventional teaching to facilitating learning more effectively.

Teachers' role would be more of facilitator in learning using various digital platforms available. Learning must be a fun and interesting for the learners. Currently, most of the jobs are getting mechanized, thus assessments of students through writing exams are of limited use. Learning must happen in a manner that it aids students to apply what he/she learnt, at the workplace when they get absorbed. This could be well achieved through digital transformation process been implemented within an educational institution.

Table 5 Reflecting the Digital Transformation that is relevant for learning by Course Work

Stages of Digital Transformation	Process Improvements
Standard (2)	Students learning by course work covering student learning, graduate attributes, teaching quality, academic integrity, assessments, academic security, students' retention, and progression
Digitization	Learning outcomes, academic rules and regulations, students' performance rating, expected teaching standards (measurable standards) are all converted into digital files. Thus, all learning related materials are available on digital format for easy references and standards revision
Digitalization	Teaching and assessments could be done using Robotics Technology. Voice Personal Assistants would play a major role in learning. Security is well assured since assessments are done using certain advanced applications. Machine learning becomes part of education.
Digital Transformation	Digital transformation turns around the conventional teaching institution into a digital learning provider. This transformation is vital as learning must happen for the students throughout their lifetime. Educational institutions slowly becoming the lifelong learning provider rather than being an institution that provides education for three to four years and makes students to learn other life lessons through other sources.

Digital transformation to provide learning to students would pose certain challenges to educational institutions like making huge investments on certain technologies and giving good amount of training to staff and students in making them aware about the uses of such technologies. This must be planned and implemented well to reap the benefits of digitization and digitalization

6.2.1 Critical Discussion on Digitization of this Process

The critical discussion on digitizing this process can be summarized as:

Table 6

Benefits	Challenges
Educational services like teaching, assessments can be digitized. Thus, this service can be made accessible to larger student community	Acquiring such technologies is an expensive process. Educational institution must be prepared to invest huge amount of money on acquiring digital technologies.
Reformed teaching and assessments for the students for better learning	Orienting students to accept this form of education is a big challenge since students are not familiar
Reach of educational services to the global market is possible with the help of technologies	Training staff and students to have access to such technologies is an expensive activity in the beginning, even though multiple advantages could be gained in the later stages.

6.3. Digital Transformation to meet Standards of Students learning by Research Work

Educational institutions do provide opportunities for the learners to learn course concepts through research work being carried out by the students. Students will have to learn by doing and through in-depth research been done by the students. Digitization would play a major role in this form of learning since students and staff are mostly involved in data collection, analysis and reporting the results. In this form of learning, digitalization becomes inevitable since learning is based on the data itself. Educational institutions would enjoy large of students getting attracted towards their programs due to the intensive digitalization been practiced and ensured. Thus, digitization becomes the source of revenue on these types of programs. Other benefits of digitalization are the same as perceived through complying with standard two of OAAA.

6.3.1. Critical Discussion on Digitization of this Process

The critical discussion on digitizing this process can be summarized as:

Table 7

Benefits	Challenges
Students can be motivated well as access to data and analytical tools available freely	Motivating students to make them involved in national important research projects is a big challenge for the educational institution.
Data analysis becomes much easier. Getting IPRs for the University is getting much easier	Adequate training on data analytics must be provided to students. This process would cost additionally to an educational institution.
Degrees awarded can be comparable with any internationally known University as research standards become comparable and standardized.	Students must be taking research projects so seriously. Research work must be carried under the strict supervision. This might slightly deviate the amount of work students willing to do on completion of a research project.

6.4. Digital Transformation to meet Standards of Staff Research and Consultancy

One of the greatest pillars that educational institutions must attract students and to gain name and fame among people, is the faculty members they have. Faculty members are highly expected to be involved in research activities to make them continuous leaners and to share the nexus of research and teaching with the students. Digital technologies and digitization are the key for the successful research work to be done. Business organizations widely accept digital technologies to improve their processes like recruitment, workforce management, manufacturing etc. (Westerman, et al, 2014).

In the same manner, educational institutions will have to encourage staff members to have IPRs registered in their names, royalties on the research work published and used. This is possible for an educational institution to achieve if digitalization is adhered to.

Table 8 Reflecting the Digital Transformation that is relevant for Staff Research and Consultancy Standards

Stages of Digital Transformation	Process Improvements
Standard (4)	Staff Research Consultancy – Planning and management, Research performance of staff, research funding schemes approved, consultancy activities, IPRs, Research Commercialization, Research and Teaching Nexus.
Digitization	Any research needs data and Data storage. Data must be collected and stored using various digital platforms available. Data collected using digital technologies would educational institutions to create a good database for in-depth research to be carried out later.
Digitalization	Big Data, Data Analytics, Cloud Computing, Social networking platforms will have to be used to make the research and consultancy work more digital rather than adopting simple files, paper, and pen approach. This process makes a university a research-based institution apart from conventional teaching and this makes them to be innovation hub.
Digital Transformation	Digital transformation happens in a manner that educational institutions get many IPRs getting registered, staff get good royalty on their research getting used. This transformation is intensive, but essential for the educational institution to have it. This transformation might also face absolute rejections at the early stages, but the merits of having digitized research would substance the resistance being raised.

When research becomes fully digitalized, data collection, in-depth research reports and getting Intellectual property Rights will become common phenomena for the educational institution. From conventional research and digital research is the transformation required for achieving this objective.

6.4.1. Critical Discussion on Digitization of this Process

The critical discussion on digitizing this process can be summarized as:

Table 9

Benefits	Challenges
Research targets for staff can be made fixed at higher level since there is an access of data	Orienting staff to accept such technologies and get trained on using them might pose a challenge for the educational institution
Data analysis becomes much easier. Getting IPRs for the University is getting much easier	Adequate training on data analytics must be provided to staff. This process would cost additionally to an educational institution.
Huge data can be stored using such technologies like cloud computing. So, the scope of research gets widened. Research projects of national importance can be taken well	Fixing research targets for staff could become harder as not all staff may have been familiar with use of digital technologies. So, achieving research targets would become tougher for an educational institution.

6.4.2. Research Motivation and Digital Acceptance Behavior in Oman

The research is well encouraged at Oman. Sultanate of Oman is allocating huge amount of money for research through budgetary allocations. Following table illustrates the contribution of the government towards research projects:

Table 10

Country	Code	Year	Internet users, percent of population	Research and development expenditure, percent of GDP
Oman	OMN	2017	80.19	0.23
Oman	OMN	2018	85.5	0.22

(Source: theglobaleconomy, 2021)

The above table illustrates the government's encouragement on research and development activities. It is clear from the above analysis, that the government is in favor of research and development activities. Thus, digitalization would help educational institutions to take part in such research and development activities of the nation.

6.5. Digital Transformation to meet Industry and Community Engagement Standards

Educational institutions must be involved in Industry and Community Engagement activities to be able to render programs that are industry relevant and most demanded in Community. Conventionally, this process is being carried out using conventional methods such as having meetings with industrialists, professional bodies, and other community associations. This process yields data and information in traditional formats such as minutes of the meetings, reports on meetings, visitors diary etc. Data being kept mostly in analog formats and used whenever required for preparing various reports. Thus, this process gets importance when there is a need, and it is not being given any relevance if there is no reporting required on this process. This could be addressed through digitizing this process. Digitalization would make educational institution to formalize data collection and preparation of reports in a more systematic and continuous manner.

Table 11 Reflecting the Digital Transformation that is relevant for meeting Industry and Community Engagement Standards

Stages of Digital Transformation	Process Improvements
Standard (5)	Industry, community engagement planning and management, relationship with employers, professions, other education providers, alumni and community at large.
Digitization	Converting data available on papers in the form of minutes, reports, and other documents to a digital format so that data can be compiled easily and quickly. Data collection must happen digitally as well. So, all such data can be stored, and reports can be prepared to comply with annual monitoring requirements as well to make plan about the future activities through Artificial intelligence mechanism.
Digitalization	Technologies such as Artificial Intelligence, Big Data, Analytics, Customer Experience and Social Networking technologies are the tools that can very well employed to make use of the data and to plan out events adequately and appropriately. Through digitalization, achieving standards could become a routine rather it is being felt forced.
Digital Transformation	Digital transformation is essential in the sense that industry and community engagement are planned with not much importance been given on certain areas, which are very much relevant for the educational institutions to capture. Digitalization would make such activities well planned and implemented and achievement of standards becoming easier.

Digitalization changes the way that industry and community engagement activities are being planned out and executed. This is the one every educational institution is looking for to comply with standards as well to remain more competitive in the market.

6.5.1 Critical Discussion on Digitization of this Process

The critical discussion on digitizing this process can be summarized as:

Table 12

Benefits	Challenges
Contacting industries and other stakeholders would become simple process	Digital transformation should have been there in those corporates where in educational institution is having close contacts. Otherwise, response would be bare minimum.
Large number of industries can be contacted, and voluminous data can be collected and stored	Motivating companies to take part in surveys and in other data collection schedules has always been a challenge for an educational institution.
Preparation of action plans and implementing them and comparison of achieved with the standards become easier	Correct data is the crucial thing here. Organizations must be taking up the responsibility of providing the data having highest accuracy level.

6.6 and 6.7 Digital Transformation to meet Standards that govern academic support services and Students Support Services

Academic Support Services are the additional support services provided to students within an educational institution, so learning happens effectively. Students will have to depend on other forms of learning such as using library facilities, getting academic advising from tutors, Information Technology resources and other teaching resources. These resources must be used by students for better learning and advancement. If these resources are provided in digital format, then maximum learning is assured. Similarly, students support services such as students' accommodation, student finances, students' satisfaction, medical and counselling facilities, recreational services etc. are taken care through optimal digital technologies, then maximum students satisfaction rate is guaranteed.

Table 13 Reflecting the Digital Transformation that is relevant for meeting academic support services and Students Support Services

Stages of Digital Transformation	Process Improvements
Standards (6 and 7)	Standard 6 - Library facilities, getting academic advising from tutors, Information Technology resources and other teaching resources Standard 7 - Students support services such as students' accommodation, student finances, students' satisfaction, medical and counselling facilities, recreational services
Digitization	Students get access to textbooks and other materials conventionally in paper format. This can be changed to digital format, so they can read them anytime, they want. Study on the go becomes feasible if digital textbooks are made available for the students to study. In the same manner, students' facilities are requested and addressed through digital technologies then issues concerning students' welfare are well taken care, which would provide an edge for an educational institution over others.
Digitalization	Technologies such as cloud apps, mobile apps, Big Data are the sources for the absolute knowledge. Textbooks available in digital format can be well read using Tabs, mobile phones and Ipad. So, learning happens all times. Secondly, about students support facilities, digital technologies such mobile apps, cloud computing would collect data accurately. Student grievances could be addressed as fast as they could using technologies such mobile apps, drones. Robotics could also be used for solving certain specific students' issues.
Digital Transformation	This transformation changes the way the university is being perceived of normally. Education becomes the priority and the same is ensured through offering such facilities through automation so teaching can happen in a more effective manner

6.6.1 and 6.7.1 Critical Discussion on Digitization of this Process

The critical discussion on digitizing this process can be summarized as:

Table 14

Benefits	Challenges
Faster support services. Educational institution could provide good services at the shortest time possible due to the use of digital technologies	Support service staff must be fully trained with the digital technologies to provide the best in terms of services provided.
Students request data can be processed faster in order to prepare annual monitoring reports at the shortest time possible	Data analytics is the key for preparation of reports. Staff must be knowing about data analytics in detail. Training is very much required.
Academic support services can be handled very professionally.	Trained staff required to process any support requested from students. Absolute care must be exercised while performing such services. A small mistake can harm the whole system.

6.8. Digital Transformation to take care of Staff and Staff Support Services Standards

Excellent Staff support services is one of the goals of an organization, especially in an educational institution. Staff in an educational institution are the assets of that institution and through them Knowledge base is being built up. Taking care of staff welfare as well as professional development needs is one of the core functions of an educational institution.

Table 15 Reflecting the Digital Transformation that is relevant for meeting Staff and Staff Support Services Standards

Stages of Digital Transformation	Process Improvements
Standards (8)	This Standard covers human resources planning and management, staff profile. Recruitment and selection, induction, professional development, performance review, promotions, staff retention.
Digitization	Extending Staff support services will have to be starting from recruitment and Selection. Digitizing the staff management services ensures good satisfaction rate since staff issues are addressed within no time. Staff profile and other staff requirements related data must be kept in digital format, so addressing such issues would never be a problem. Digitization would ensure addressing issues on time which results in reduced staff turnover ratio.
Digitalization	Technologies such as Artificial Intelligence, Big Data and Analytics, E-signature can very well be used in educational institution to retain the staff. Certain non-value adding activities could be phased out due to digitization of staff support services activities.
Digital Transformation	Digital transformation gives an edge to an educational institution since staff welfare is well taken care through digitization. Through digitization, knowledge base is kept without getting depleted since staff turnover becomes negligible. Digitization changes the way that an educational institution perceives its staff. The importance would be well recognized if digitization is in place.

An educational institution can work to make staff 100% satisfied over the services provided. With the help of digital technologies, an educational institution can try to achieve this.

6.8.1. Critical Discussion on Digitization of this Process

The critical discussion on digitizing this process can be summarized as:

Table 16

Benefits	Challenges
Staff turnover can be made zero as the digital technologies make every staff member happy over the services been provided by an educational institution.	Staff member must be already satisfied with the practices being adopted in an educational institution, so they can be motivated further to use digital technologies.
Staff services can be standardized and made on par with international standards. Technologies make educational institutions possible to achieve this	Staff members must be familiar with digital technologies being used. Educational institution must make staff members aware of digital technologies.
Investments once made is expected to produce results for so many years.	Investments on procuring technologies must be made educational institution must be prepared to invest that much of amount on procuring such digital technologies.

6.9. Digital Transformation to take care of General Support Services

In the same manner, other facilities provided such as public relations, marketing, communication services, facilities management can be nicely provided and economically used if digitization process is well adopted within an organization. Educational institutions must be cost conscious as well so that objectives attainment is economically done. Educational institutions though not looking for profits, but optimum utilization of resources is the key for them. Resources utilization is becoming an achievable target if digitization is well perceived by that educational institution. Several digital technologies such as apps, mobile computing, tablets, E-Signature could be well utilized by an institution to gain a competitive edge in the market.

6.9.1. Critical Discussion on Digitization of this Process

The critical discussion on digitizing this process can be summarized as:

Table 17

Benefits	Challenges
Competitive edge can be acquired	Technology savvy people should be there to make use of such technologies.
Best services can be provided	Urging people to use such technologies would cost a lot
Improvements can be chartered out clearly	Motivation level must be maintained at high level

7. CONCEPTUAL FRAMEWORKS ON DIGITAL BUSINESS TRANSFORMATION

Recent study by Nwaiwu (2018), assessed various conceptual and theoretical frameworks related to the phenomenon "Digital Business Transformation" with the objective of assessing their suitability and robustness of addressing the subject.

The study assessed the following ten frameworks considered relevant to the subject of Digital Business Transformation (DBT).

- The Six keys to success framework proposed by Kavadia et al. (2016)

- Digitization Piano Digital Business Transformation Framework proposed by Wade (2015).

- The Digital Reinvention Framework proposed by Berman et al., (2016)

- Digital Innovation Strategy Framework: for diagnosing and improving digital products and service innovation proposed by Nylén & Holmström (2015)

- The Technology Acceptance Model (TAM) framework proposed by Davis (1989)

- The Digital Business Transformation framework proposed by Corver and Elkhuizen (2014)

- The Digital Orchestra framework was proposed as a replacement for the Digital Piano framework published in a report by the Global Centre for Digital Business Transformation - (GCDBM) - an initiative by IMD and Cisco Corporation (Wade et al, 2017).

- Digital Transformation Framework, by Matt et al. (2015)

- Digital Enterprise Integrative Management Framework proposed by Bowersox et al. (2005)

- The Unified Theory of Acceptance and Use of Technology (UTAUT) Framework proposed Venkatesh et al. (2003).

This list of proposed digital business transformation frameworks was based on an extensive desk research on the related subjects 'Digitalization', 'Digital Business Transformation', 'Technology use behaviors'. Out of the ten frameworks chosen using a rigorous selection criterion, only two were found scientifically validated (academic frameworks). They are Item number 5. The Technology Acceptance Model framework proposed by Davis (1989) and Item number 10. The Unified Theory of Acceptance and Use of Technology (UTAUT) Framework proposed by Venkatesh et al. (2003) and the remaining had their origins in Business Publications. This clearly shows the gap in this area of research and the industriousness of Business publications in researching the current business phenomenon. Both the scientifically validated frameworks (academic frameworks) focus on individual perspectives rather than the organizational perspectives' whereas DBT is more of an organizational phenomenon. This is evident in the constructs covered by most of the business-originated frameworks such as human resource issues, customer engagement/centricity, and agility, reveal the limits of academic frameworks in understanding digital business transformation.

The essence of this case study is synthesizing for "What to transform" and "How to transform" from the identified ten conceptual frameworks which will be useful for practitioners in deciding the course of action in DBT of their organization. This is presented in the following table:

Table 18

What to Transform?	How to Transform?
Business Model	1. By linking technology trends to market needs
New ways to work	2. Through organizational change and development of digital Business Agility
Internal Processes	3.Organizations leadership deciding what type of value they want to create and decide the strategic options to achieve it.
Stakeholders engagement	4.To achieve digital reinvention, organizations must pursue a bottom up reinvention of strategy.

Product (Value Propositions)	5. To transform products, organizations process, and systems powered by customer understanding
Changes in Organizational Structure	6. Coordinate, privatize and implement Digitalization
Human Resources	7. Achievement of "True collaboration" within a supply chain with DBT
IT Capabilities	8. Using technologies for ensuring connectivity
Channels (Go to Market)	10.Cloud computing becomes the basis for connecting channels
Culture	11. Awareness creation and use of IT systems
Environment (Digital Evolution Scanning)	12. Digitizing functions
Customer Engagement	13. Connectivity Platforms
Measurement and Metrics	14. Information Systems
Financial Stewardship	15. Database management Systems implementation.

7.1. Conceptual Model for Digital Transformation for Educational Institutions

Proposed Conceptual Model for the present study based on the review of Digital Business Transformation Frameworks.
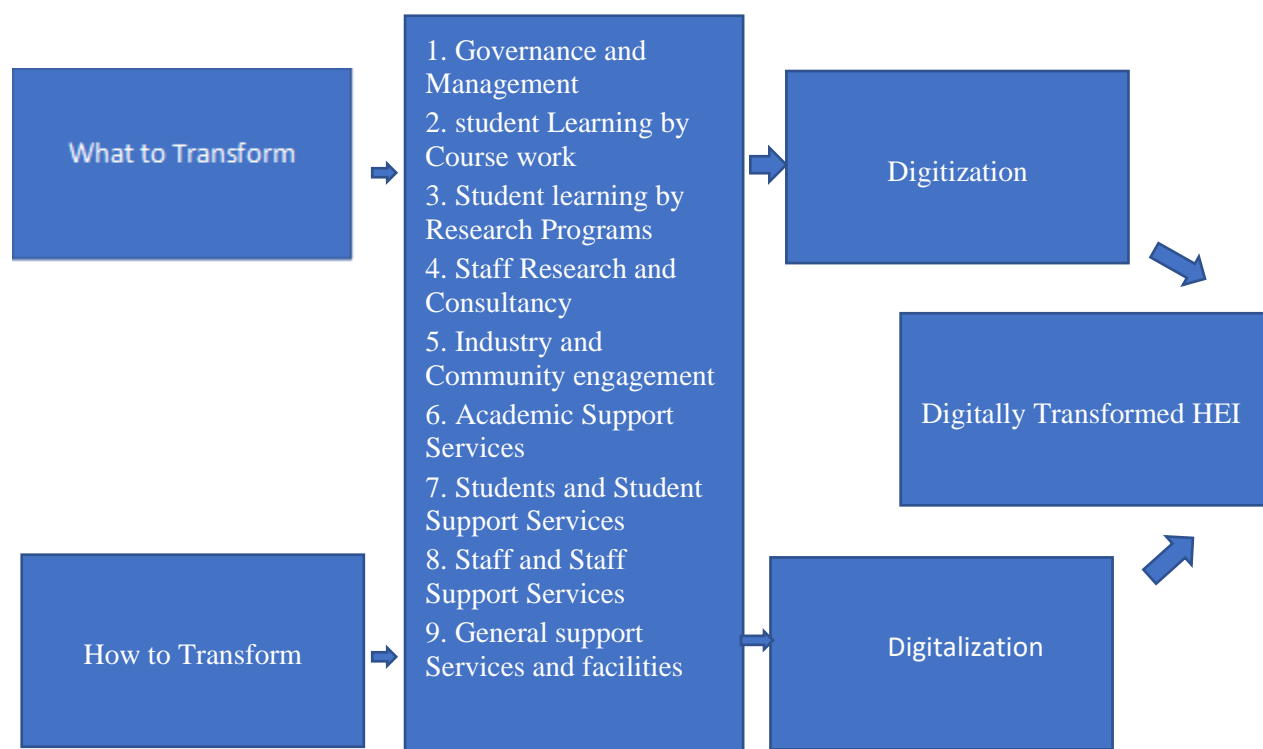

Figure 2

8. FINDINGS, DISCUSSION AND RECOMMENDATIONS

Educational institutions in Oman are into face-to-face learning and technology-based learning. For such educational institutions, recommending use of institution wide digital technologies in a greater extent possible is vital since top-notch performance in its operations has always been their core objective. Educational institutions are competing in Oman through value addition extended. Thus, value addition could very well be maximized through use of digital technologies such as leading academics; learning analytics, adaptive learning technologies, IOT, Mobile Learning, Natural User Interface, Next Generation LMS, Affective Computing,

Augmented Reality, Virtual Reality and Robotics. Blockchain, Cloud Computing, Artificial Intelligence etc.

Educational institutions are focusing on value additions possible, and the market is providing certain technologies for ensuring value additions, thus, there must be willingness and good perceptions for incorporating such technologies in their operational processes from educational institutions. Such willingness and perceptions are the key variables for the successful digitalization of educational services. For adding further value in educational services through use of certain digital technologies, there must be willingness from the top management of an educational institution. The gaps existing between the value additions to be created and the values currently being rendered would possibly be brought narrower through use of digital technologies in educational processes.

Higher Educational Institutions would become highly competitive and regard technology as one of its key success factors. Educational institutions would become highly compatible to produce graduates who can meet the technological changes and challenges more effectively through getting into such high-tech processes being adhered. Educational institutions are becoming the source of experiencing of digitization of operations, thus, graduates becoming capable of adjusting to.

Though educational institutions are not profit oriented, their awareness towards resources utilization and cost consciousness will have to be further strengthened. This would be possible through use of certain technologies available. Digitization and digitalization would pave the way for achieving this objective. Education provided in more economical manner, but yielding huge benefits are the core intents of educational institutions. Achieving these two common objectives is becoming easier through digitization and digitalization, thus digital transformation becomes more effective.

Digital transformation of educational services provides a good platform for educational institutions to get overwhelming benefits in terms of reaching out world's students community. Even though digitization needs huge amount of resources to be invested, at the end it would bring out huge amount of benefits for the institution. digitization would attract students from all over the world and at the same time, delivering curriculum becomes easier through use of digital technologies. Educational services could be provided keeping highest standards and through which the requirements of stakeholders could be met with no compromises on the quality and in attainment of goals.

9. CONCLUSION

Higher Educational Institutions are playing a pivotal role in an economy since they are contributing for acquiring, transferring, and delivering the perfect knowledge to the society. Drucker (2017) argues that new knowledge is one of the sources of innovation. Accordingly, higher educational institutions must be taking the responsibility of providing new knowledge and improved knowledge to students' community to make them be able to think and react positively that brings out changes in the way an economy is functioning currently. This is highly possible provided educational institutions indulge themselves in using various digital technologies such as AI, Block Chain, Robotic Automation etc in delivering their academic and non-academic services so that academic research would be highly encouraged, and new knowledge would be generated and passed on to students' community.

Higher Educational Institutions in Oman are progressing well towards achieving internationalization through having close associations with internationally known knowledge transferring universities (Taqi, 2017). At the same time, they are also equipping themselves in terms of having effective academic and non-academic processes so that they become

comparable in terms of value of services extended. To become comparable with international universities and standards and to comply with OAAA standards, perfection in services is highly expected and demanded. Higher Educational Institutions can perform better in terms of value extended to an economy if such institutions are technologically advanced and practising latest technologies.

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